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UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Entomology Research Branch

BEE BEHAVIOR

The honey bee is often called a domesticated bee, and is thus placed in a class with our farm animals. The truth of the matter is that the honey bee is far from being domesticated. Apparently it is as wild today as it was centuries ago, in spite of the fact that man and bees have always been closely associated. Other wild animals that our early ancestors sought to tame and domesticate have yielded to man's influence, and many of them are now as dependent upon man as man is upon them. The honey bee, however, shows no change as the result of its long association with the human race.

There are no domesticated bees. The bees that inhabit a countryside apiary are as wild as those found in a bee tree in the densest part of a forest. Bees taken from a bee tree and placed in a modern hive are at once just as much at home as if they had always lived there. On the other hand, if a swarm of bees departs from a modern apiary and sets up its abode in some hollow tree, it is able to fare as well as any of its ancestors that knew no habitation other than hollow trees and caves.

To understand why the honey bee has not been domesticated, one must know something about the make-up of the colony. Ordinarily a colony consists of 30,000 to 60,000 individuals. Of this number several hundred may be drones, or male bees. The drones are unable to gather their own food, and, having no sting, they cannot defend their home. Their only function in life is to mate, and, incidentally, they die immediately afterwards. Heading the colony is one queen, who likewise has but one function, to perpetuate the race. After a queen mates with a drone, she returns to the hive and never again leaves it except at swarming time. She has no responsibility other than egg laying, and this she does well, being able to lay as many as 1,500 eggs a day for several days at a time. After laying the eggs she gives no further thought to her growing family. She takes no part in feeding the young and never goes to the field for nectar or pollen. The remainder, and most numerous part, of the colony is made up of worker bees, females who lack the ability to reproduce but have all the other maternal instincts. They feed the queen mother and their brother drones, they take care of the young, they keep the hive spotlessly clean, they secrete the wax with which to build comb, and they toil in the fields searching for pollen and nectar. While gathering nectar and pollen, the worker bees perform an inestimable service to mankind by pollinating the blossoms in our orchards so that we may have more and better fruit. The duty of defending the hive also falls to the lot of these daughter bees, and at this, as we all know, they are experts, since each is armed with a sting sharper than the finest needle.

To go back to the reasons why the bee has not become domesticated, the queen and the drone are the only individuals in the colony that have the power of reproduction, but neither has much contact with the outside world. Their work never varies; they do not have to buffet all kinds of weather; they take no part in defending the hive. In other words, they have few new experiences. The worker bees, on the other hand, are subject to a multitude of new experiences and new conditions, but since they have no offspring they cannot pass the benefits on to future generations.



Man has effected little change in the honey bee through breeding. He has been able to control the mating of most animals and plants, but the queen bee mates only on the wing while high in the air, and attempts to control mating by allowing queens and drones to fly in cages or large enclosures have failed. Within recent years, however, workers in the Department of Agriculture and elsewhere have been able to control the mating of queens and drones through the use of instruments, and in time it should be possible to develop superior strains of honey bees.

Although man has not tamed the honey bee, he has been able to make it serve his needs through a knowledge of its behavior. The beekeeper, for instance, who produces as much as 200 pounds of honey per colony in 3 or 4 weeks has accomplished this, not by training his bees, but by studying their behavior and adjusting his practices accordingly.

The beekeeper knows that the average life of the worker bee during the active season is only about 6 weeks, and that the first half of its life is spent in the hive attending to household duties, the other half in the fields. He also knows that, contrary to early belief, the bees never come to know their master, and he can therefore work in another apiary just as well as in his own without getting stung. Every person who works with bees is stung occasionally, but it is doubtful whether the bees show any preference in the matter. The layman who is stung most is probably the person who is most nervous and afraid of the bees.

The honey bee is the only one of the common bees that loses its sting in an effort of defense, and in losing its sting the honey bee also loses its life. The sting becomes so firmly anchored in the flesh that in trying to tear itself away the bee is injured internally and dies in a few minutes. Thus, there is probably not a honey bee alive that has ever stung a human being; yet each instinctively knows how to use this effective weapon of defense.

Always about the hive are a few bees whose task it is to defend the colony, and in plunging its sting into an enemy a bee sacrifices its life for the welfare of the colony. The assumption of this duty by only a few bees is a wise provision of nature. If all the bees in a hive rushed out and were successful in stinging their victim, the colony would perish. The beekeeper knows this, and he also knows that he can divert the attention of the guards with a little smoke and by judicious handling. He can then safely open a hive and with his bare hands remove frame after frame with thousands of adhering bees. If he accidentally crushes a bee, he may be stung. It is not uncommon for a guard to go back on duty soon after being smoked, and it will then sting the owner as readily as if he were a casual stranger. When away from the hive bees can scarcely be induced to sting. If you pick up a bee from a flower and hold it in your cupped hands in such a manner that the bee cannot escape and yet has room to walk about, it will make no attempt to sting. If you squeeze it, of course, the story will be different. Ordinarily the honey bee stings only in defense of the colony; it does not sting in self-defense, since to do so means death. This is not true of other

bees. Bumble bees, wasps, hornets, and yellow jackets sting not only in defense of the colony but in self-defense, and they can sting many times, for the act does not cost them their lives.

In closing, just a word about the work of honey bees. Although no careful census of the bee population of the United States has ever been made, it is estimated that during the active season upwards of 280 billion honey bees are hard at work. At the end of the season they have produced about 200 million pounds of marketable honey and about 4 million pounds of beeswax. Their greatest work, however, is in the cross-pollination of our fruit, forage and vegetable crops which result in larger and better crops. They even help to maintain our high dairy industry by perpetuating various plants that grow in pastures and meadows. Not only is agriculture heavily indebted to the honey bee, but even religion is under obligation to this industrious insect for the beeswax candles that light our altars.

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